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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/582,341	06/09/2006	Tomoya Sugita	28951.1176	4982
53067 7590 02/21/2008 STEP TOE & JOHNSON LLP 1330 CONNECTICUT AVE., NW WASHINGTON, DC 20036				
EXAMINER				
BEDTLEYON, JOHN M				
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/582,341

Applicant(s)

SUGITA ET AL.

Examiner

JOHN M. BEDTELYON

Art Unit

2874

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 November 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 June 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-8508)
- Paper No(s)/Mail Date _____

- 4) ☐ Interview Summary (PTO-413)
- Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

FINAL REJECTION

Response to Amendment

1. This action is responsive to the amendment and remarks filed on 11/19/07.

Claims 1-5, 7-10, and 12-14 are amended. No claims were added or canceled. Claims 1-14 are currently pending in the application.

Response to Arguments

2. In view of the remarks by the Applicant, with respect to the objections to the drawings and the inconsistent terminology in the specification, these objections are withdrawn.

3. Applicant's arguments filed 11/19/07, with respect to the 35 USC 112, first paragraph rejection have been fully considered but they are not persuasive.

The definition of the term "curve" is given as "a line that deviates from straightness in a smooth, continuous fashion" (The American Heritage Dictionary of the English Language). It appears from the instant application's specification and drawings that the light is reflected by the light path coupling parts in order to optically couple the waveguides together. These reflections cause the light path to deviate from a substantially straight path, at a sharp angle, to another substantially straight path. In other words, the use of the term "curve" throughout the specification and the claims appears to be contradictory to the definition of the word.

4. Applicant's arguments filed 11/19/07 with respect to the 35 USC 112 second paragraph rejection have been fully considered but they are not persuasive. The Applicant submits that the amendment to claim 7 moots the rejection. The Examiner

respectfully disagrees. Claim 7 depends from claim 1, and further includes the phrase "the semiconductor laser." There is no laser or any light source of any kind in claim 1 or claim 7. Therefor, it is impossible to determine the metes and bounds of claim 7.

5. Applicant's arguments filed 11/19/07 with respect to the prior art rejections of the claims, have been fully considered but they are not persuasive. The Examiner has thoroughly reviewed the Applicant's arguments, but believes the cited references to fully and properly meet the claimed limitations.

6. With respect to claims 1 and 13 the Applicant argues that Stites fails to disclose or suggest a "plurality of light path coupling parts which couple adjacent waveguides and optically couple said plurality of waveguides serially."

7. The Examiner respectfully disagrees. The beveled end faces 110Ea, 110Eb1 and 2, and 110Ec optically couple the waveguides (110a, 110b, 110c) together, which meets the limitation "plurality of light path coupling parts which couple adjacent waveguides and optically couple said plurality of waveguides serially." The phrase "which couple adjacent waveguides" is broad enough that an optical coupling fully meets the limitation.

8. Next, the Applicant argues that the beveled end faces are not "coupled" to the prisms (110a, 110b, 110c) and that the end faces are merely surface ends of the prisms and are not separately coupled to the prisms.

9. The Examiner respectfully disagrees. Firstly, the end faces are optically coupled to the waveguides and are therefor coupled to the prisms. Secondly, there is no such limitation in the claim that states that anything must be separately coupled to the prisms.

10. The Examiner believes the Applicant may be implying that by claiming a plurality of waveguides and further claiming a plurality of light path coupling parts, these elements must be two distinct and separable elements. The Examiner respectfully disagrees. The definition of the term "part" is "a portion, division, piece or segment of a whole" (The American Heritage Dictionary of the English Language). The beveled end faces of the prisms most certainly are a portion of the whole prism, and therefore meet the limitation of being a part.

11. For brevity of prosecution and for arguments sake, if such a limitation was claimed, in that the light path coupling parts had to be a distinct and separate physical structure from the prism, the Examiner submits that the reflective coating on the inside of the prism, as described in Stites' claim 7, could be considered the light path coupling parts, which is physically and directly coupled to and separate from the prism.

12. With respect to claims 13 and 14, the Applicant argues that the JP '107 reference does not teach "a plurality of light path coupling parts which couple adjacent waveguides and optically couple said plurality of waveguides serially," because the prisms 81-85 do not couple adjacent waveguides, but are instead connected to one of transparent boards 91-94.

13. The Examiner respectfully disagrees. The prisms 81-85 optically couple the adjacent waveguides (71-73), which meets the claimed limitation of "coupling". The inclusion of transparent boards 91-94 is irrelevant.

14. For arguments sake, if the claims were so amended to require the light path coupling parts to physically and directly couple the adjacent waveguides, the parts could

Art Unit: 2874

be interpreted to be piece 81, 82 and 91 together, along with 83, 84 and 92. That would yield a plurality of coupling parts that directly and physically couple adjacent waveguides.

15. Lastly, Applicant argues that the prisms are not separate from the transparent bodies 71-73.

16. The Examiner respectfully disagrees. Firstly, they most certainly are separate, as they form boundary planes (101, 102, 103, 104, and 105) (see paragraph [0041]). Secondly, the limitation that the prisms are separate from the transparent bodies is not even included in claims 13 or 14.

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 1, 8 and 13 rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The claims recite the limitation the paths for transmitting lights through the plural waveguides are curved, but it is unclear from the drawings and specification how they are curved. The drawings and specification teach planar reflective surfaces for changing the light path but no curve. The Examiner believes the term "curve" was

erroneously used and interprets the limitation to mean that the light paths of the separate waveguides aren't collinear.

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claim 7 recites the limitation " θ is a minimum beam spread angle possessed by the semiconductor laser" in lines 8-9. There is insufficient antecedent basis for this limitation in the claim, as there is no light source or semiconductor laser in claim 1 or claim 7.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1-4 and 13 are rejected under 35 U.S.C. 102(b) as being anticipated by Stites (US Patent 6,324,330, hereinafter Stites).

With respect to claim 1, Stites teaches:

An optical element (100) comprising: a plurality of waveguides (110a, 110b, 110c) transmitting a light (130); and

a plurality of light path coupling parts (110Ea, 110Eb1, 110Eb2, 110Ec) which couple adjacent waveguides (in this case they optically couple) so as to optically couple said plural waveguides serially (see figures 5 and 13, column 6, lines 45-54), wherein

the paths for transmitting lights through the plural waveguides are curved at least one part of said optical path coupling parts (see figures 5 and 13).

With respect to claim 2, Stites teaches:

An optical element as defined in claim 1, wherein an odd number of waveguides are provided as said plural waveguides, and said odd number of waveguides are disposed overlapping with each other in parallel with respect to the light transmission direction of said waveguides (see figures 5 and 13).

With respect to claim 3, Stites teaches:

An optical element as defined in claim 1, wherein external surfaces other than the light incident surface and the light output surface of the waveguide path comprising said waveguides and said light path coupling parts are coated by a reflection film reflecting the transmitting light (see claims 6 and 7).

With respect to claim 4, Stites teaches:

An optical element as defined in claim 1, wherein said light path coupling parts have inclined surfaces which are inclined with respect to a plane vertical to the light transmission direction and are integrated with said waveguides at either or both of said adjacent waveguides (see figures 5 and 13).

With respect to claim 13, Stites teaches:

A two-dimensional image forming apparatus (see figure 13) comprising: a laser light source (410) emitting a laser light;

a space optical modulation part (IP) that modulates a laser light emitted from the laser light source;

and an illumination optical system (400) for illuminating the laser light (450, 130) that is outputted from the laser light source to the space light modulation part (see figure 13), wherein said laser light source (400) has a plurality of waveguides (110a, 110b, 110c) transmitting a light, and a plurality of light path coupling parts (110Ea, 110Eb1, 110Eb2, 110Ec) coupling adjacent waveguides so as to optically couple said plural waveguides serially (see figures 5 and 13, column 6, lines 45-54), and the paths for transmitting lights through the plural waveguides are curved at said optical path coupling parts (see figures 5 and 13).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

9. Claims 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stites (US Patent 6,324,330, hereinafter Stites).

With respect to claim 8, Stites teaches:

A laser light source (400) comprising a laser (410) and an optical element (100) which emits the laser light which is emitted from said laser with transmitting the same, wherein said optical element includes a plurality of waveguides (110a, 110b, 110c) transmitting light, and a plurality of light path coupling parts (110Ea, 110Eb1, 110Eb2, 110Ec) which couple adjacent waveguides (in this case they optically couple) so as to optically couple said plural waveguides serially (see figures 5 and 13, column 6, lines 45-54), and the path of the light for transmitting the light through the plural waveguides are curved at said optical path coupling part (see figures 5 and 13).

Stites is silent to the laser light source being a semiconductor light source.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a semiconductor laser light source as the laser light source as described in the Stites reference, as semiconductor laser light sources are well known in the optical arts and are beneficial because they are inexpensive light sources that are known to be efficient at producing light signals. .

With respect to claim 9, Stites teaches:

An optical element as defined in claim 8, wherein there is provided a convex lens (420) or a plano-convex lens which is disposed on an optical path between the semiconductor laser and the optical element and makes the spread angle of the

laser light incident to the optical element smaller than the spread angle of the laser light that is emitted from the semiconductor laser (see figure 13).

10. Claims 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stites (US Patent 6,324,330, hereinafter Stites), as applied to claim 1 above, in view of Japanese Published Patent Applicant No. Sho.59-180519 (hereinafter '519).

With respect to claims 5 and 6, Stites teaches the limitations of claim 1 as previously stated, and further teaches said waveguides are of a hollow structure (claim 6).

Stites is silent to the hollow structure containing either of gas or liquid and Brownian particles, wherein said Brownian particles are colloid particles.

'519 teaches a container an cigarette smoke injected into the container wherein the cigarette particles float while performing Brownian motion, laser light is irradiated to the particles thereby causing a Doppler shift and thereby the frequency range is broadened. Therefore, the coherency of the laser is reduced, which prevents the generation of interference of the light, which would cause a more even light distribution having a high degree of spatial uniformity ('519, Abstract and translated portions of the text). Smoke particles are colloid particles.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to include the Brownian particles (cigarette smoke, or the like) as taught by '519 inside the hollow prism waveguides of the Stites device because the

particles help reduce the coherence of the laser light, thereby preventing generation of an interference pattern which would increase spatial uniformity of the Stites device, which is highly desirable (column 1, lines 1-26).

11. Claims 10 and 11 rejected under 35 U.S.C. 103(a) as being unpatentable over Stites (US Patent 6,324,330, hereinafter Stites) as applied to claim 8 above, in view of Japanese Published Patent Application No. Sho.58-48013 (hereinafter '013).

With respect to claims 10 and 11, Stites teaches the limitations of claim 8 as previously stated. Stites further teaches a lens (420) (see figure 13) that's used to focus the light into the waveguide (110a).

Stites is silent to the lens being a cylindrical plano-concave lens.

'013 teaches a plano-concave lens (4) (figure 1c) that allows the beam spread angle to be increased or decreased which allows a further way to change (improve) the light intensity distribution to the desired pattern (figure 1c and translated text).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a plano-concave lens as taught in '013 in the Stites device as it allows for further control of the spread of the light beam entering the waveguiding device, and would allow for increased control in the light intensity distribution.

12. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Stites (US Patent 6,324,330, hereinafter Stites) as applied to claim 8 above, in view of Japanese Published Patent Application No. Hei.6-51236, hereinafter '236.

With respect to claim 12, Stites teaches the limitations of claim 8 as previously stated.

Stites is silent to the light incident surface of the optical element is curved.

'236 teaches a waveguide (1) with a spherical (curved) light incident surface for the benefit of increasing the uniform intensity distribution of the light passing through the waveguide (1).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have a curved input as taught by '236 in the device of Stites as the curved input surface would converge light beams that are impinging on the input surface and increase the number of reflections inside the waveguide which improves spatial uniformity of the light.

13. Claims 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Japanese Published Patent Application No. Hei.8-111107, hereinafter '107, in view of Stites (US Patent 6,324,330, hereinafter Stites).

With respect to claim 13, '107 teaches:

A two-dimensional image forming apparatus (see figure 5, 6, 7 and 9) comprising: a light source (20) emitting a light; a space optical modulation part (320) that modulates a light emitted from the light source; and an illumination optical system for illuminating the light that is outputted from the light source to the space light modulation part (see figures), wherein said light source has a plurality of waveguides (71, 72, 73, 74) transmitting a light, and a plurality of light path coupling parts (81, 82, 83, 84, 85) coupling adjacent waveguides so as to optically couple said plural waveguides serially (see figures), and the paths for transmitting lights through the plural

waveguides are curved at said optical path coupling parts (see figures and translated text).

'107 is silent to the light source being a laser light source.

Stites teaches a laser light source (410) for use in a similar spatially uniform light projector (see figure 13).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to replace the light source house (50) of the '107 reference with the laser light source (410) of the Stites reference because the light source (20) in the '107 reference is disposed in a reflective house/mirror (50) at a first focus location, thereby allowing the mirror (30) to focus the light into the first waveguide (71), wherein the laser source (410) of the Stites reference is more collimated and would increase the coupling efficiency into the waveguide.

The motivation to use the laser light source instead of the light source housing (50) would be to decrease the size of the light source apparatus as a whole and increase the coupling efficiency of light into the waveguide.

With respect to claim 14, '107 teaches:

A two-dimensional image forming apparatus as defined in claim 13 wherein there is provided a projection optical system (330) which projects the light that is emitted from the space optical modulation part (see figure 9).

Conclusion

14. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JOHN M. BEDTELYON whose telephone number is (571)270-1290. The examiner can normally be reached on Monday - Friday, 10:00am - 6:30pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rodney Bovernick can be reached on 571-272-2344. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/John M Bedtelyon/
Examiner, Art Unit 2874

/Kevin S Wood/
Primary Examiner, Art Unit 2874